Iowa Power Fund Board – Due Diligence Committee (DDC)
Meeting Minutes
March 31, 2008

Iowa Utilities Board, Lobby Conference Room
Iowa Utilities Board
350 E. 12th Street
Des Moines, Iowa

Call to Order:

Roya Stanley, Chair, called the meeting to order at 1:05 P.M.

Roll Call:

Member	Present	Absent
John Brighton	X	
Franklin Codel	X	
Ted Crosbie		X
Vern Gebhart		X
Patricia Higby	Conf. call	
Fred Hubbell	X	
William [Curt] Hunter		X
Roya Stanley	X	

- Also in attendance from the OEI, Governor's Office: Jennifer Wright, Michelle Bauer, Deborah Svec-Carstens (associate general counsel, Governor's Office), Lucy Norton and Tom Wind (of the Iowa Power Fund) and Brian Crowe (Recording Secretary).

Approval of Agenda:

Roya suggests to remove Mr. Codel moved, with Mr. Hubbell seconds that the agenda for this meeting is approved passed on voice vote.

Approval of Minutes:

No minutes to be reviewed.

Chair's Remarks:

Chairperson Stanley no comments.

Full-Application Review

Mr. Codel believes that there are several proposals that may not need technical review and should be reviewed first to move forward for Iowa Power Fund Board review.

1041-UNI Determining Maximum Sustainable Production of Biomass with Mixture of Prairie Species: Presenters: Daryl Smith and Dave Williams; Tallgrass Prairie Center

Presentation:

- Need for carbon negative feedstock needs
- Increased corn acres and soil erosion are concerns
- Partnership with Cedar Falls Utilities to find more carbon neutral fuels.
- Goals are to determine the best mixture of prairie species grasses for fuel feedstock.
- No large scale prairie grass planting testing currently exists.
- Mixture of species have a benefit to slow run-off and control soil erosion and can store more carbon
- 98 acres rented from the Blackhawk County Conservation Board
- 48 test plots from 11/4 acres to 21/2 acres

- testing four varieties of prairie species in test plots
- testing carbon sequestration and harvesting, transport, storing, shredding and cubing
- test burn will take place at Cedar Falls Utilities
- Year one funded by the Iowa Legislature
- They are requesting funds for years 2, 3, 4 of a 5 year project.

Questions

- Q. If there is a possibility of more funding from the legislature? A. There is not any additional funding anticipated from the Legislature.
- Q. Is 1 year funding an option? A. It usually takes 3 years for prairie grass research to be undertaken.
- Q. Why is Cedar Falls not providing cost share? A. They will be test burning the grasses that are burned at their facilities.
- Q. How will utilities know if the burn is successful? A. That information will be provided in published test results, conferences, etc. It will also be provided through ISU Extension and NRCS.
- Q. Is there concern about getting an emissions permit from the DNR? A. There does not seem to be any concern.
- Q. How many combinations of research will be undertaken? A. There will 48 research plots and 4 replications for every seed mixture.
- Q. Will results be published before the final study is completed? A. Yes, there will be information that comes out periodically.
- Q. What is the target of this research? A. They would like to explore if CRP could be used for biomass, and also if crop land is cost competitive with traditional agriculture farmland.
- Q. Is there similar research being conducted elsewhere? A. There is some research happening in Minnesota, but this is on a larger scale. It is also different than Sheridan Valley who is only using switchgrass vs. prairie grasses.
- Q. Will the test burn quantify emissions? A. Yes, they will follow all protocol that exists for emissions review.
- Q. Will there be a characterization of the cellulosic material that could be used for ethanol? A. No, there would need to be review of all the different species to determine the viability for ethanol use.
- Q. Will the Power Fund Board pay for tuition? A. The intent is to cover the tuition and stipend for graduate students.
- Q. Do the regents have a contract with the states for indirect? A. More recently the indirect cost has been 10%.
- Q. What if the Power Fund funded half the proposal? A. The project would have to be scaled back dramatically, and the quality of the research will be diminished.

There is the recommendation that this proposal goes the full board:
Yes: Brighton, Codel, Higby, and Hubbell the DDC should allocate the full $600,000 from this year's appropriation.

Will the IPF cover tuition?
What is the appropriate rate for indirect funds from the state is it 8% or 10%.

1045: POET Project Liberty- Presenter Jim Sturdevant

- Project Liberty is the design and construction to convert a corn ethanol refinery and integrate the process with cellulosic ethanol
- The plant is in Emmetsburg, IA.
- There will be an anaerobic digester, biomass boiler, fractionation in the process.
- 11% more ethanol from corn, 27 more ethanol from an acre of corn, significant reduction in fossil fuel consumption
- replicable and willingness to license to other companies
- biomass mostly comes from crop residue, highest concentration in Iowa

- corn cobs are consistent, have minimal environmental impact, one pass harvest, higher ethanol yield from cob than stover, greater bulk density, and it is a captive feedstock, it is a proven technology.
- They have harvested 4000 acres of corn cobs.
- POET will be working with 30 farmers this fall in Iowa to harvest cobs.
- Working with the Department of Energy's Biomass Program and will provide up to $80 million dollars.
- John Deere and many other partners engaged.
- Many Iowa companies are engaged in this project for the cob supply chain.
- Project is currently in Phase 1; design, environmental engineering, and cob feedstock, phase 2 is contraction.
- Iowa will benefit by having one of the world's first commercial scale cellulosic ethanol biorefineries.
- Emmetsburg would benefit from a $200 million investment, 35 new biorefinery jobs, 400 farmers harvesting cobs, $5.4-$10.8 million in annual cob payments (assuming $30-$60 per ton.)
- Licensing of the technology is paramount to this projects success.
- Anaerobic digestion will reduce natural gas energy needs for the plant by 80%.
- This is a major step forward for biofuels in the state of Iowa.
- www.projectliberty.com

Questions

- Q. When will production begin and what will the cost be? A. Production will begin in 2011; projections show that long term the process will be cost effective. There is a risk mitigation plan that was worked through with the US Department of Energy. There is thought that this process will be more cost effective over time.
- Q. Under what percentage of the pricing scenario do not equate to an adequate return? A. The range looks good to POET. There are many variables in the risk mitigation plan. There is confidence that the plant will be commercially viable. There are many milestones that must be cleared to ensure that the project is commercially viable.
- Q. Is there a take away from the Register article about Emmetsburg Kick Off Meeting? A. The sense is that there are skeptics about whether the equipment will be there and harvest will not be slowed. The meeting was positive in POET's opinion, and people felt that the cob price was a good price knowing that they would not be responsible for the transport to the biorefinery from the farm.
- Q. What was involved with the Department of Energy's technical review? A. The DOE reviewed the detailed plan in November, and environmental engineering piece based on the nation Environmental Protection Act. A third party engineer was hired by DOE to access 4 aspects of the program to ensure continued funding.
- Q. What was the logic of a $20 million dollar request? A. The amount was based on the amount of financing that would be required and reasonable and cash equity and in-kind services POET was able to secure for the project.
- Q. Would POET be prepared to visit with Power Fund Board members to review the risk and return for POET? Yes.
- Q. Would additional funding be necessary to replicate this project if successful? There are many uncertainties at this point about farming equipment, ethanol production, etc. The goal though is that this is a stand alone commercially viable entity.
- Q. How did DOE feel comfortable committing $80 million without all the financing in place? A. The DOE has milestones in place before the balance of funds is allocated to POET. DOE wants to know that the technology will work, and that financing from outside lenders will be available as a grant of forgivable loan. Without the funding from the Power Fund, POET would need to step back and look at the viability of the project.
- Q. What would the funding look like if paired with DOE's hurdles? A. The next hurdle is environmental, and then the next four hurdles are engineering hurdles.
- Q. Is POET willing to make a commitment on the licensing timeline? A. They will roll this technology out to other POET biorefineries but they cannot speak to specific timelines. But, they would be willing to discuss timelines in negotiations.
- Q. When will the study on corn cob removal be available? The study will be available this week. Preliminary results show that the removal of cobs has a negligible effect.
- Q. When would the funding need to be made available? A. The construction of the plant would be from the Power Fund.

- Q. How will storage, shelf life, etc. be covered? POET is investing in this research but it is not a function of Project Liberty. POET currently has 48 different experiments, and is working to develop the cob supply chain.
- Would POET be willing to submit full financials and DOE tech assessments to the Board? Yes.

There is the recommendation that this proposal goes the full board:
Yes: Brighton, Codel, Higby, Hubbell

1. **There is a question about the amount necessary for a viable project. This is a huge investment for one project.**
2. **There needs to be clarity on the how and the when on the replication.**
3. **there needs to be better understanding what the environmental impacts of the technology**
4. **There needs to be access and review of the DOE study of the environmental and technical reviews.**

If DOE will release the already completed technical documents, and if DOE will allow the project manager to respond to questions from the OEI and the Power Fund.

1073: Efficient, Low Cost, Photovoltaic Solar Energy Conversion- Presenter Vikram Dalal, ISU

RECUSAL: JOHN BRIGHTON

Proposal

- This project is to develop high performance this film silicon solar cells
- World market is 2.83 gigawatts equal to 3 large coal or nuclear plants
- 40% annual growth rate, grown in large part though subsidies in Germany
- 91% of the world's solar market is silicon cells
- This project will work with Iowa's own PowerFilm which will have a manufacturing plant in the Ames/Boone area
- Solar costs still too high, the costs needs to be around $1.50/w for silicon wafers
- Path research on novel organic polymer chemistry based materials
- The central ideas is change the supper lattices layers solar film and improve the light absorption (30%)
- 7 Ph.D. faculty and scientists, 100+ years experience
- PowerFilm and Micron Technology, about $75k per year in both cash and in kind.
- Educate 10 students a year in this field (7 grad students, 3 undergrads)
- Patents will belong to ISU, but there is concern that the technology is highly patentable, and the technological review needs to be done by trustworthy sources.

Questions
- Q. How will the companies benefit? A. This proposal will improve Iowa companies' technology.
- Q. Are there other research institutions involved in this research? A. There are some German and Japanese entities working in research, but not in plastic.
- Q. Who else has the group got funding from? A. Department of Energy, National Science Foundation, Iowa Energy Center, no others at Iowa State are aware of other funding for this technology.
- Q. How long does it take to take the technology to market after research? A. After the 3 year research the solar film should be highly marketable.
- Q. It looks as those there are 3 research projects identified in the full app? A. Task 1 and 2 are linked and 3 are a longer-term research project. (1 and 2 could be funded without 3).
- Q. Who would not be acceptable to review this technology? A.
- Q. Would the applicant be amendable to sharing of IP? A. They would discuss with partners.

There is the recommendation that this proposal gets a technical and financial potential review.
Yes: Codel, Gebhart, Higby, Hubbell

1. **The board may want to determine the amount of funding for this project (potentially phase 1, 2 or 3)**

1059-Iowa Stored Energy Park, Kent Holst-

Presentation:

- The project was started by municipal utilities
- Trap air in sandstone formation by displacing water.
- Compressing is done at night and on weekends when energy is cheap.
- This is a series of vetted technologies that are combined in new ways
- There are two other storage facilities in the world: Germany and Alabama.
- There is a $1.5 million dollar earmark in the Federal DOE budget administered by Sandia National Laboratory.
- In the packets there are technical and feasibility studies in the Due Diligence done by the Stored Energy Park- there are also executive summaries of the full reports of the technological scope that has been done by the Stored Energy Park.
- The idea is to eventually release all the information gained from this proposal. But currently the information needs to be protected to ensure the success of this project.
- The technology could possibly be replicated in Iowa.
- This is a $220-$240 million dollar project.
- This is intermediate power facility, not a baseload facility.
- Geologists have confidence in the geological formations.
- Funds are needed to drill test wells to test the chemistry, confirm the water migration rate, and confirm the standard input and output rates.
- The geologist's model suggests that 13 wells are necessary.
- Total drilling is $4 million, and $3.2 million request from the Iowa Power Fund.

Questions

- Q. What runs the turbine? A. Air is compressed and natural gas runs the turbine.
- Q. Why aren't there more stored energy parks? A. Natural gas costs made the project unfeasible. With current prices the prospects are much more likely.
- Q. What about an earthquake? A. This has been addressed by geologists who believe that the project location is in an inactive zone, and is not at risk for an earthquake. The project will be located in Dallas Center.
- Q. Will there be a wind farm co-located at the facility? A. There will not, which means that this will be an energy storage park, not necessarily a wind farm.
- Q. Will this work at other sites? A. To the extent that this site works, independent studies would need to be done to see if the technology would work in other parts of Iowa.
- Q. How much energy could be stored at this facility? A. 1 power plants output for 20 days. 268 MW.
- Q. What happened to the energy storage facility in Ohio? A. The project has never been developed.

    1. **It is unclear if there are environmental benefits or price savings.**
    2. **There needs to be engineering modeling.**
    3. **There might need to be a DNR groundwater review.**
    4. **It is unclear where the energy is coming from, and if there is an environmental benefit.**

There is the recommendation that this proposal gets re-reviewed by the due diligence committee.
Yes: Brighton, Codel, Higby, Hubbell

1006- Reducing the Energy and Environmental Costs of Drying Corn Distillers-Ken Kaplan

Presentation:

- The company is focused on improving the corn ethanol model

- Current processes with DDGS consistency, transportation, and nutritional value are issues that need to be addressed.
- Cellencor seeks to use industrial microwave drying technology.
- Microwaves are clean and efficient and produce no emissions.
- Microwaves reduce drying energy costs by 30-50%.
- Reduced greenhouse gas emissions, particulates, odor, and VOC emissions.
- Less water consumption: 1 less gallon of water used per gallon of ethanol produced.
- Microwaves increase natural enzymes and proteins with low temp drying in DDGS by 15-20%
- Two key partnerships: Alliant Energy and Ferrite
- Alliant has the ability to offer financing to large ethanol companies.
- AEC Engineering in Minneapolis, MN has confirmed research including energy savings, process architecture, and carbon credit creation
- First small scale operation will be in operation at a 35 million gallon facility this fall.
- This is a near term technology development.
- Licensing agreements with ethanol companies, percentages of equipment and engineering services, profits from sales of private label enzyme indicatives.
- Power Fund dollars would be used to install a full scale microwave at an Iowa ethanol plant.
- The project will maintain the prosperity brought to the State by the corn ethanol business
- Will help protect Iowa's air and water resources by reducing emissions and water use.

Questions

- Q. Why is Cellencor the right company to roll out this technology? A. Cellencor has patents and patents pending, and Cellencor also has a distribution agreement with equipment manufacturers.
- Q. To the extent that the project is successful there will be return to the Power Fund? A. That would be up for negotiation.
- Q. If Cellencor is successful in capitol raising would the company increase the match? A. There are many other areas that the company is investing in like animal feeding trials, which are other interests for the company.
- Q. Have there been pricing assumptions for new equipment upgrades? A. There is the assumption that the return would come in about 2 years. They can dry a ton of grains at $30 dollars a ton.
- Q. What are the projected revenues? A. There is a very high upside to this business. This business could increase dramatically in the next three years. This could be a $50 million dollar company in the next 3 years.

There is the recommendation that this proposal gets reviewed by the board.
Yes: Brighton, Codel, Higby, Hubbell

1. **Is the current engineering review adequate? There should be review of the AEC report.**
2. **There should be a DNR review of the technology.**
3. **Smaller investment vs. smaller override.**
4. **Deeper business plan for the company would be beneficial.**

Other Business

- **None.**

Adjournment:
There being no further business to discuss at this time, the meeting adjourned at about 5:20 P.M. It was indicated the next meeting would be Wednesday, April 23rd TBD.

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Roya Stanley, Committee Chair

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Brian Crowe, Recording Secretary

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Date